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ABSTRACT

A study examined the use of a body awareness microcomputer program on young children as a predictor of early reading achievement. Subjects, 58 preschool and kindergarten students (prereaders) from a university laboratory school in the southern region of the United States, were asked to work in the microcomputer center in small groups to identify body part pictures and respond to some questions as these pictures appeared on the computer screen. Achievement tests were administered the next year. Results indicated that identification of body parts by oral expressive language and type of gender were not significant predictors of reading achievement in three regression analyses. However, independent variables of age and visual comprehension were found to be significant predictors for word reading, sentence reading, and total reading achievement test scores. Findings suggest that further investigation should be made to analyze the correlation of visual perception skills such as the visual comprehension of body part placement and early reading achievement. (ARH)

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Research: Body Awareness and Early Achievement

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Abstract

This is a report of the findings of an evaluation study examining the results of the use of a body awareness microcomputer program on young children as a predictor of early reading achievement. Two reading achievement prediction variables and the two other independent variables of age and type of gender were analyzed in a backward stepwise multiple regression on each of the dependent variables of word reading, sentence reading and total reading achievement. Results indicated that identification of body parts by oral expressive language and type of gender were not significant predictors in all three regression analyses. Each of the independent variables of age and visual comprehension were found to be significant predictors for word reading, sentence reading and total reading achievement test scores. Results of this study indicate that further investigation should be made to analyze the correlation of visual perception skills such as the visual comprehension of body part placement and early reading achievement.

Research: Body Awareness and Early Achievement

The need for the identification of predictors of early reading achievement is of a high priority to educators and parents today. The awareness of the importance of the acquisition of reading as a facilitator in the study of all content areas inclusive of reading itself is recognized. A positive beginning in early reading is considered most desirable as it lays a foundation for later learning experiences.

What skills are predictors of early reading achievement? To find the answers to this question, one must consider the basic areas of cognition that are considered important in reading acquisition. One area of great importance is oral language acquisition and comprehension. Many theorists agree that not only the acquisition of words but the control over various aspects of spoken language and insight into the nature of words in a prereading stage of development is a foundation for formal reading acquisition in later stages of development (1). The direction of this theory implies that oral language acquisition alone is not enough for assistance in formal reading acquisition. Skill in spoken language and knowledge about language, or linguistic awareness, are very important to early reading acquisition (2).

Another area of great importance in the acquisition of reading is perception. Visual discrimination of letters and words is considered by some theorists to be a very important visual perception ability for young readers (3). Research in the area of visual information processing describes skills such as visual association (4), knowledge of orthographic structure (5), and other visual perception skills (6) as possible areas of great importance to reading acquisition. Review of research leads to the conclusion that findings are contradictory and further research is needed in the area of visual comprehension of imagery and its relationship to reading acquisition.

A third area of great importance to reading acquisition is the self-concept. It has been found that among various variables found to effect reading acquisition, the self-concept is closely related to the immediate success in learning how to read (6). In many early education curriculums the self-concept is taught through self-awareness which includes self-image activities such as learning about body parts and their functions (7, 8). It should also be noted that body imagery is the basis of the Goodenough-Harris Drawing Test (9) which is an intelligence test for children. The drawing of body parts correctly onto a basic figure is a part of the Learning Accomplishment Profile

Diagnostic Screening Edition (10) instrument which identifies at-risk children in learning and development areas. Many theorists find intelligence tests helpful in predicting reading achievement at the readiness level (6), therefore, the self-concept may have an indirect link to reading acquisition success.

These three skill areas of language comprehension, visual comprehension, and the self-concept should be considered when planning a reading readiness curriculum because these skills have been found to be important to the acquisition of reading. With these skills in mind teachers and parents can choose microcomputer software which strengthen and practice these foundation skills.

One such microcomputer program is Body Awareness (11). While using Part I of the program the student can be asked to use the oral expressive language comprehension skill of naming the body part displayed on the screen. As the student is asked to describe the correctness or incorrectness of the placement of the body part on a picture, visual comprehension skills are practiced. And, Part I of this program works directly with the self-awareness skills of body part naming and placement which are a part of self-concept development. Therefore, this program offers a unique situation for reading readiness skill development as it can measure

and present language and visual comprehension skills while practicing self-concept development.

THE STUDY

Subjects

The subjects for this study were 58 preschool and kindergarten students attending a half-day nursery or kindergarten program at a university laboratory school in the southern region of the United States. The population attending this school can be described as predominately caucasian and middle socio-economic class. The sample consisted of 34 girls and 24 boys with ages ranging from 56 to 78 months. The original sample size was 81 subjects but due to attrition the final sample size was 58 subjects.

Procedures

In late Spring a learning center containing an Apple IIe, disk drive, and monitor was introduced to the classes in which the study was conducted. In large or small group discussions the subjects were instructed as to the name and functions of each piece of hardware used (microcomputer, disk drive and monitor). They were also given a demonstration of how microcomputer programs can be run. It was explained to the subjects that they would be working with a teacher at this microcomputer center during the next few days. It was

thought that this type of introduction to the project would help the subjects feel more comfortable and, therefore, work more effectively.

The subjects were asked to work in the microcomputer center in small groups (no more than three students). The teacher explained that they were going to be asked some questions about the program they would see on the monitor and that each student was to give his/her own answer. Part I of the microcomputer program of Body Awareness (11) was run for each group of students. As the ten body part pictures appeared in the upper right corner of the screen each subject was asked to orally name that body part. Although the printed name of the body part was also displayed the subjects used in this study were pre-readers and had to rely on their oral expressive language comprehension of the body part word to respond to this question. As the body part was displayed in the upper right corner it was also drawn onto a body trunk. Each student was asked if they thought that the body part was placed correctly on the body by stating "yes" (it was placed correctly) or "no" (it was placed incorrectly). The subjects were shown a total of ten different body part pictures as follows: four arm, two leg, one foot and three hand pictures. These same ten pictures were

shown as four correct placements and six incorrect placements on a body trunk.

The project teacher used the same copy of the microcomputer program in the same microcomputer and disk drive with each group of students. The manner in which the program was used remained invariant throughout the project as any differentiation in use would automatically cause a change in program presentation and picture display.

In the late Spring of the next year the subjects were given achievement tests in a large group situation by their classroom teacher. Information such as identification number, sex, age, body awareness scores and reading achievement scores were recorded for each subject.

Instrumentation

Two reading readiness comprehension scores were obtained from the use of Part I of the Body Awareness program (11). A score of oral expressive language comprehension of the names of the body parts (WORD) was obtained as the percent of correct responses to the ten body part pictures displayed. A score of the visual comprehension of body imagery (VISCON) was obtained as the percent of correct responses to the ten correctness of placement of body parts displayed.

Three types of reading achievement scores were obtained from each subjects next year's achievement test results. Raw score information in the areas of Word Reading (WR), Sentence Reading (SR), and Total Reading (TOTAL) for each subject was recorded from their Stanford Achievement Test Series (12). The reading achievement test scores in the areas of sounds and letters and word study skills were not recorded as not all subjects were given these areas of testing.

Data Analysis

A descriptive statistical analysis of data was conducted to describe each variable as to its range and variance (see Table I). The variable of the gender of the subject (SEX) can be described as 34 female and 24 male subjects. The variable of age in months (AGE) ranged from 56 to 78 and had a standard deviation (S.D.) of 6.81. The body awareness variable of (WORD) scores ranged from 48 to 100 and had a S.D. of 13.69. The second body awareness variable, (VISCUM), scores ranged from 15 to 100 with a S.D. of 19.31. The three different reading achievement scores of word reading (WR), sentence reading (SR) and total reading (TOTAL) descriptive statistics are as follows: ranges equal 09 to 38, 18 to 68 and 40 to 113 with S.D.'s of 8.13, 16.75 and 23.66 respectively. These descriptive

statistics indicate that there were more female than male subjects. The variance and range in AGE is typical of two consecutively aged school groups. The variables of WORD, VISCOM, WR, SR and TOTAL score ranges and variance indicate a variety of achievement levels which is indicative of need for further analysis of this data collection. The Statistical Analysis System, SAS, was used for all data analyses.

(insert Table 1. here)

RESULTS

Three backward stepwise multiple regressions were computed to analyze the statistical significance of the independent variables of SEX, AGE, WORD, and VISCOM as predictors on each of the three dependent variables WR, SR and TOTAL (see Table 2). Results from these analyses indicated that the variable WORD was removed from all three regressions in Step 2. It is noteworthy to observe that the F statistics for WORD were extremely low in all three regression analyses, .35, .10 and .25 respectively. The variable of SEX was removed in the Step 3 of all three regressions with the F statistics of 2.80, 2.49, and 1.83. The variable of AGE was retained in the third step of the three regressions as a statistically significant predictor. This variable received extremely high F statistics of

49.10 for WR, 55.59 for SR, and 47.28 for TOTAL. The other statistically significant variable retained in the third step of each of the three regression analyses was VISCOM with F statistics of 9.83 for WR, 13.89 for SR, and 13.85 for TOTAL. It should also be noted that the R^2 in each regression was little changed after the removal of both of the variables SEX and WORD as follows: .589 to .574 for WR, .634 to .617 for SR, and .604 to .589 for TOTAL.

(insert Table 2. here)

DISCUSSION

This was a multiple correlation study which investigated the results of the use of a body awareness microcomputer program and their correlations to later reading achievement test scores. Statistical significance based on gender was not found in any of the three regressions which included scores in the reading achievement areas of word reading, sentence reading and total reading. Although the previously described review of research and literature indicated that oral language comprehension is a significant variable in early reading achievement, the microcomputer variable of body part oral language comprehension (WORD) did not compute as a significant correlation to any of the reading achievement score areas. As is logically predictable the variable of

age was computed to be a significantly, positively correlated variable to all of the reading achievement score areas. Including this variable as part of the backward stepwise multiple regression analysis was very important because older students would have been expected to achieve higher reading score levels. The presence of the age variable in this multiple regression analysis served to prevent the other variables from spuriously obtaining statistical significance due to their association with age. The significance tests regarding the other variables were there by freed of the concern that they might be acting as a proxy for age. The microcomputer program performance variable of visual comprehension of body part placement (VISCOM) was computed as a significant predictor of all three reading achievement score areas. As previously mentioned, the review of research and literature in the area of visual skills and their relationship to reading achievement and acquisition is multi-directional and inconclusive. While some researchers found visual discrimination of letters significant to reading acquisition and achievement, others found visual acuity or comprehension as a significant factors. This study may have introduced a new approach to measuring visual skills as it concerns visual comprehension of body imagery as displayed on a

microcomputer monitor. The use of microcomputer programs which can create visual images on a monitor is quite different than using visual images displayed in a book, on paper, projected onto a screen or in a moving picture on film. As technology improves the quality of microcomputer programs and monitors, visual imagery will become an important factor in comprehension skills. The results of this investigation calls for further research in two areas of microcomputer programing for learning skills. First, more research is needed in the area of visual comprehension of body imagery as displayed from a microcomputer program and its relation to reading achievement. Secondly, more research is needed in the area of display quality and its significance to subsequent visual comprehension and oral language skill achievement.

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Table 1. Variable, Number, Minimum Value,
Maximum Value and Standard Deviation

Variable	Number	Minimum Value	Maximum Value	Standard Deviation
SEX (male)	24	_____	_____	_____
SEX (female)	34	_____	_____	_____
AGE	58	56	78	6.81
WORD	58	48	100	13.69
VISCOM	58	15	100	19.31
WR	58	9	38	8.13
SR	58	18	68	16.75
TOTAL	58	40	113	23.66

Table 2. Backward Stepwise Multiple Regression Statistics as Steps, Dependent Variables, Predictor F - Statistics and R^2 s

Step	Dependent Variable	Predictors				R^2_s
		SEX	AGE	WORD	VISCOM	
1.	WR	2.82	39.97***	.35	9.23*	.598
2.	WR	2.80	42.52***	—	10.80*	.595
3.	WR	—	49.10***	—	9.83*	.574
1.	SR	2.48	46.03***	.10	13.38**	.634
2.	SR	2.49	48.54***	—	14.98**	.634
3.	SR	—	55.59***	—	13.89**	.617
1.	TOTAL	1.84	38.83***	.28	12.76**	.604
2.	TOTAL	1.83	41.27***	—	14.65**	.602
3.	TOTAL	—	47.48***	—	13.85**	.589

* $p < .01$

** $p < .001$

*** $p < .0001$